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ABSTRACT

The focus of this study was to determine the causal linkages among home environment, self-concepts, prior ability, and socioeconomic status on mathematics achievement and science achievement of gifted students. The Walberg Productivity Model (H. Walberg, 1984) served as a basis for analyzing the interconnections among the family processes. Campbell's Differential Socialization Paradigm (J. R. Campbell, 1994) was the theoretical framework used to analyze the ethnic differences. The study was conducted with high achieving high school students (106 Asian and 107 Caucasian) and their parents (357) from New York City and Nassau and Suffolk Counties in New York. Partial Least Squares Path results showed that prior ability played a major role in influencing the child's educational achievement. A key finding was that press for intellectual development had direct negative effects on prior ability for Asian students. (Contains 1 table, 4 figures, and 34 references.) (SLD)

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The Differential Effects of Family Processes and SES on Academic Self-Concepts and Achievement of Gifted Asian American and Gifted Caucasian High School Students

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The Differential Effects of Family Processes and SES on Academic Self-Concepts and Achievement of Gifted Asian American and Gifted Caucasian High School Students

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Abstract

The focus of this study was to determine the causal linkages among home environment, self-concepts, prior ability, and socioeconomic status on mathematics achievement and science achievement of gifted students. The Walberg Productivity Model served as a basis for analyzing the interconnections among the family processes. Campbell's Differential Socialization Paradigm was the theoretical framework used to analyze ethnic differences. The study was conducted with high achieving high school students (106 Asian and 107 Caucasian) and their parents (357) from New York City, and Nassau and Suffolk Counties in New York. PLSPath results showed that prior ability played a major role in influencing the child's educational achievement. A key finding was that press for intellectual development had direct negative effects on prior ability for Asian students.

The Effects of Home Environment on Academic Achievement

Within the past three decades the home environment has been identified as being a contributing factor in a child's educational and cognitive development. Bloom (1986) hypothesized that the home environment had significant effects on the level of student learning. The home environment exerts direct (Gyles, 1990; Song & Hattie, 1984) and indirect effects on the child's achievement (Keith, Reimers, Fehrmann, Potterbaum & Aubrey, 1986). Iverson and Walberg (1982) found that the sociopsychological environment and intellectual stimulation in the home are prominent in influencing academic ability and achievement. Children's academic achievement was found to be effected by varying family processes (Campbell & Wu, 1994). Excessive pressure and help were found to be dysfunctional for math achievement, whereas, support and the level of intellectual resources were found to have direct positive effects.

The home environment and family processes provide a network of physical, social, and intellectual forces and factors which effect the student's learning. The family's level of encouragement, expectations, and educational activities in the home is related to socioeconomic status (Song & Hattie, 1984). Families from different socio-economic groups create different learning environments that effect the child's academic achievement (Bloom, 1964). Schneider (1993) hypothesized that parental involvement can counteract the negative effects of low socioeconomic background and significantly improve students' performance. Parental involvement concerns the utilization of numerous family processes which in turn create opportunities for learning (Muller & Kerbow, 1993).

Studies have compared Asian and American learning environments. People who share a common cultural background will also share to a certain extent common patterns of intellectual abilities, thinking styles, and interests (Lesser, 1976). National differences may reflect culturally

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transmitted values, beliefs and behaviors (Hess, Chih-Mei & McDevitt, 1987).

Education ranks first in Asian homes. It is viewed as a once in a lifetime opportunity and is a highly prized commodity in their culture (Stevenson, 1983). Asians are group-oriented and will sacrifice personal gains for the good of the family (Campbell & Connolly, 1984). They are more competitive than Americans, as honor and prestige are integral parts of their character (Campbell & Connolly, 1984; 1987). Chinese Americans retain the beliefs, attitudes, and values of their former countries (Campbell & Connolly, 1987; Huntsinger & Jose', 1993). The Asian parents are very supportive and take pride in their children's dedication and inner drive. They advocate equal expectations for sons and for daughters and encourage both to enter the technical fields (Campbell & Connolly, 1987) and aspire to seek higher education (Youn, 1994).

The parental processes used by Chinese American and Caucasian American parents differ (Huntsinger, 1992). Campbell and Connolly (1984; 1987) showed that Asian American parents took an active role in creating a supportive atmosphere, supervising homework and providing tutors. Asian American children spend more time on homework than any other ethnic group (Muller & Kerbow, 1993). Other American children spend much less time on homework and receive less help from parents (Stevenson, Lee & Stigler, 1986). Japanese American and Chinese American parents purchase supplemental math and science materials to help in additional problem solving activities. Chinese American fathers give more help in math and mothers assist in other subject areas (Stevenson, 1983). Chinese American parents use pressure as a motivational device to excel. Comparisons between neighboring children are more evident in Chinese American homes than in other American homes (Campbell, 1994).

Parents differ on their views of innate ability and effort as promoting success or placing responsibility for failure, despite the traditional regard for achievement and success in America. However, Caucasian American parents considered effort less important than innate ability (Stevenson, 1983). They believed effort is more effective for persons of high ability than those students with low ability (Ryckman & Mizokawa, 1988). Therefore, ability alone is not the most important factor for achievement (Purkey, 1970). Through the years researchers have been trying to explain the causal relationship among ability, self-concepts, and achievement. The relationship between self-concepts and achievement is associated with improvement in ability (Hansford & Hattie, 1982)

Gifted students perceive themselves as being smarter. They have a better understanding of what contributes to success and failure. They are aware of their special status and expend the effort necessary to achieve at a level commensurate with their ability. These students possess the motivation necessary to achieve. They consider effort as the main ingredient for success or failure (Davis & Connell, 1985).

Theoretical Frameworks

The nine factor Walberg Model (1984a, 1984b, 1986) served as one of the theoretical framework for the study. The interconnections within three areas of this model (ability,

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motivation, home environment) were analyzed to determine their direct and indirect effects on achievement. Campbell's Differential Socialization Paradigm (1994) was the other framework employed. Campbell (1993) analyzed 565 research reports and identified psychological variables that are hypothesized to be involved in the differential socialization of children. This schema provides a mechanism for understanding the great complexity of the socialization process among these gifted children..

Objectives

The purpose of this study was to identify those factors that contribute to gifted high school students' achievement (mathematics, science). This study sought to answer the following research questions:

1. To identify those factors that contribute to highly gifted Asian American and Caucasian high school student's math and science achievement.
2. To determine the linkages among socio-economic status (SES), family processes, specific academic self-concepts (math and science), and academic achievement.
3. To test the factor structure of mothers', fathers' and children's perceptions for four family processes (pressure, support, help, press for intellectual development).
4. To what extent do general self-concepts and subject matter self-concepts affect achievement in gifted students?
5. What effect does the socioeconomic factor have on achievement of gifted students?

Data Source

Participants

This study was conducted in Metropolitan New York area. Participating in the study were 225 highly gifted students: 109 males and 116 females, ranging in age from 16 to 18; and 357 parents, 161 fathers and 196 mothers. One hundred fifty three of the participating students were semi-finalists or finalists in the Westinghouse Talent Search. The ethnic composition of the students was 107 (48%) White, 106 (46%) Asian, 3% Hispanic, and 3% Black. Thirty-four percent of the students were born in a foreign country. For the purpose of this study, highly gifted students were those students who have a mathematics and/or science grade point average of 86% and above and who have been placed in a gifted class in their school.

Methods

Instrumentation

The students and their parents were asked to respond to the Inventory of Parental Influence (IPI) (Campbell, 1994). This instrument was designed to identify a family member's perception of the following family processes: (a) parental pressure, (b) parental psychological support, (c) parental help, (d) parental press for intellectual development (resources), (e) parental monitoring/time management. The first two family processes (Part I) are factor scales that have been developed from Likert statements. The respondents express their degree of agreement or disagreement with each statement (a. strongly disagree; b. disagree; c. uncertain; d. agree; e. strongly agree). Part II of the IPI contains the next three factor scales. Each family member specifies how often each practice occurred (a. never; b. rarely; c. sometimes; d. usually; e.

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always). The IPI isolates children's (Form K) and parents' (Form G3) perceptions of these five family processes.

Each student was asked to respond to the Self-Confidence Attribute Attitude Scale (SaaS) (Campbell, 1994) which measures the student's general self-concept, math self-concept, and science self-concept. The SaaS contains 34 Likert scale items. The reliabilities of these scales ranged from .92 to .99.

Information regarding the parents' occupational and educational background was collected from the parents. The Nam-Powers Scale (Nam & Powers, 1983) was used to convert the parents' occupational information into an interval scale. The parents' educational data, along with the occupational status comprised the composite variable of socioeconomic status.

Information pertaining to the student's academic achievement was obtained from the schools. The school personnel provided final marks for the academic subjects; grade point average; the number of advanced placement courses taken; letter grades were converted to numerical grades by equivalency tables supplied by the individual schools.

Results

Asian American vs Caucasian American

Table 1 lists both means and standard deviations for all measures used in these analyses. The ethnic differences between Asian Americans and Caucasian Americans were analyzed by calculating effect sizes and t-tests. The effect sizes were tabulated. A positive effect indicates that the Caucasian Americans' mean scores are greater than the Asian Americans' mean scores, while a negative value indicates a higher mean score for the Asian Americans.

This procedure revealed15 significant ethnic differences on the .05 level of significance . Findings for parental processes revealed the Asian American students perceiving much more parental pressure (g=-.49) from their mothers, self-pressure (g=-.56), and mother's monitoring (g=-.31) than Caucasian students. Whereas, the Caucasian American students reported more perceived father's support (g=.20), Although, press for intellectual development (g=.18) and help (g=.16) did not indicate a great difference it did show an inclination toward the Caucasian American students.

Among the SES variables the Caucasian Americans were found to have better educated mothers (g=.60) and fathers (g=.47). Parental occupation was also in favor of the Caucasians (father's g=53, mother's g=50).

The Asian Americans had higher math achievement scores (g=-.21) than Caucasian Americans students. In terms of self-concepts, the Caucasian students' results exceeded the Asian Americans for general self-concept (g=.47) and science self-concept (g=.20). More Westinghouse competition participants came from the Asian American group (g=-.39), however, more Caucasian students enroll in advanced placement courses (g=.33).

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TABLE 1

Means and standard deviations of the study's predictor variables for gifted Asian American and Caucasian High School Students

Variable		Asian American	Caucasian American
SES			
	M	58.91	74.75
	SD	31.94	28.23
PR			
	M	2.41	2.01
	SD	.72	.72
SUPP			
	M	3.83	3.87
	SD	.48	.47
HELP			
	M	2.36	2.46
	SD	.88	.97
PID			
	M	2.32	2.87
	SD	.89	1.02
MON			
	M	2.20	2.14
	SD	.63	.57
GEN			
	M	3.69	3.98
	SD	.63	.61
MSC			
	M	3.55	3.57
	SD	.61	.70
SSC			
	M	3.70	3.80
	SD	.51	.47
GGPA			
	M	90.92	86.91
	SD	18.35	26.69
WW			
	M	.59	.40
	SD	.49	.49
AP			
	M	2.95	3.64
	SD	1.89	2.30

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Path Analysis

Separate path analyses were calculated for Asian American and Caucasian American students using Partial Least Square Path Analyses (PLSPath) (Sellin, 1983) with math and science achievement as the dependent variables. The order of variables and factors in the path model was determined by the three criteria: time, logic, and previous research (Campbell, 1996).

PLSPath includes Jackknife procedures that omitted one case at a time (blindfold) and re-estimated the model parameters on the remaining cases. The output included Jackknife standard errors, and R^2 values. The PLSPath program includes factor analytic subroutines for creating new latent variables. For example, a composite latent SES variable was constructed using father's education, mother's education, father's occupation, and mother's occupation. A prior ability variable was developed using the general grade point average, advanced placement, and whether or not a student won a Westinghouse award. Based on theoretical considerations, we created a second-order factor by combining parental monitoring with parental pressure. Direct and indirect influences were determined by the path analyses. The significance of the path coefficients was determined with a formula developed by Keeves (1996).

Results

The results of this study included the following findings (see Figures 1-4).

1. The strongest predictor of achievement in all of the analyses was prior ability. However, for Caucasian students, SES was found to negatively effect math achievement.
2. The specific academic self-concepts were not significant predictors of achievement (math, science).
3. Specific family processes were found to have important effects on the academic self-concepts, however, for Asian American students' math self-concept no effect was found. Parental pressure was found to have negative effects on the children's academic and general self-concepts. The results of the pressure factor were in line with past empirical studies (Campbell, 1994; Koutsoulis, 1995; Verna, 1996). Psychological support was found to positively effect all the self-concepts for Caucasian children, and the general self-concept of Asian American children. Parental help was found to negatively effect the academic self-concepts of Caucasian children. Parents who saw themselves as helpful seemed to undermine their children's math and science achievement. Press for intellectual development was found to negatively effect prior ability for Asian American students, while it had significance on Caucasian students' prior ability.
4. SES was found to be an important influence of math and science self-concepts for Caucasian students. SES was found to influence achievement indirectly by influencing family processes.
5. In terms of Campbell's Differential Socialization Paradigm--Asian American students perceived more parental pressure, less parental support and help than Caucasian students.

Discussion

This study underscores the important role parents play in their use of specific family processes. Asian parents and Caucasian parents have differential effects on their children's academic self-concepts and indirectly on their children's achievement. Socioeconomic status profoundly influenced achievement indirectly via the family processes. SES was a major

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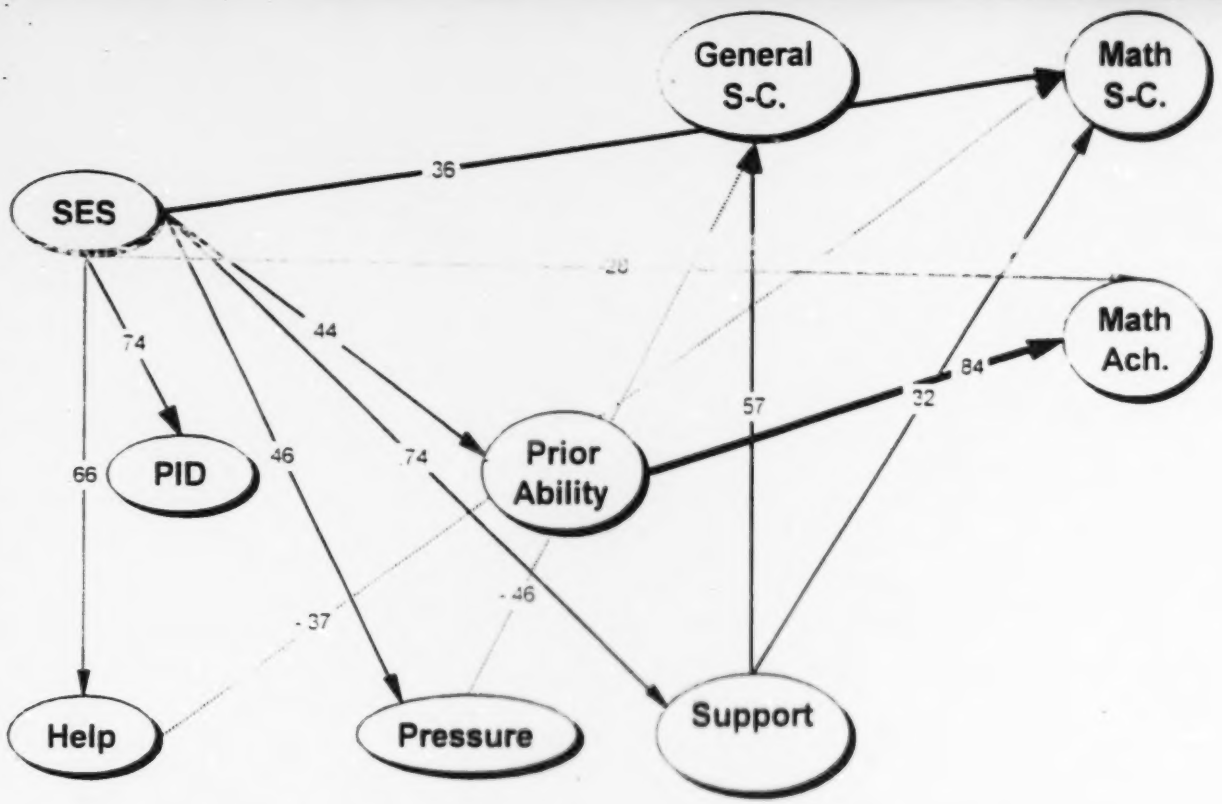

Figure 1 Math Achievement Gifted Caucasian Students

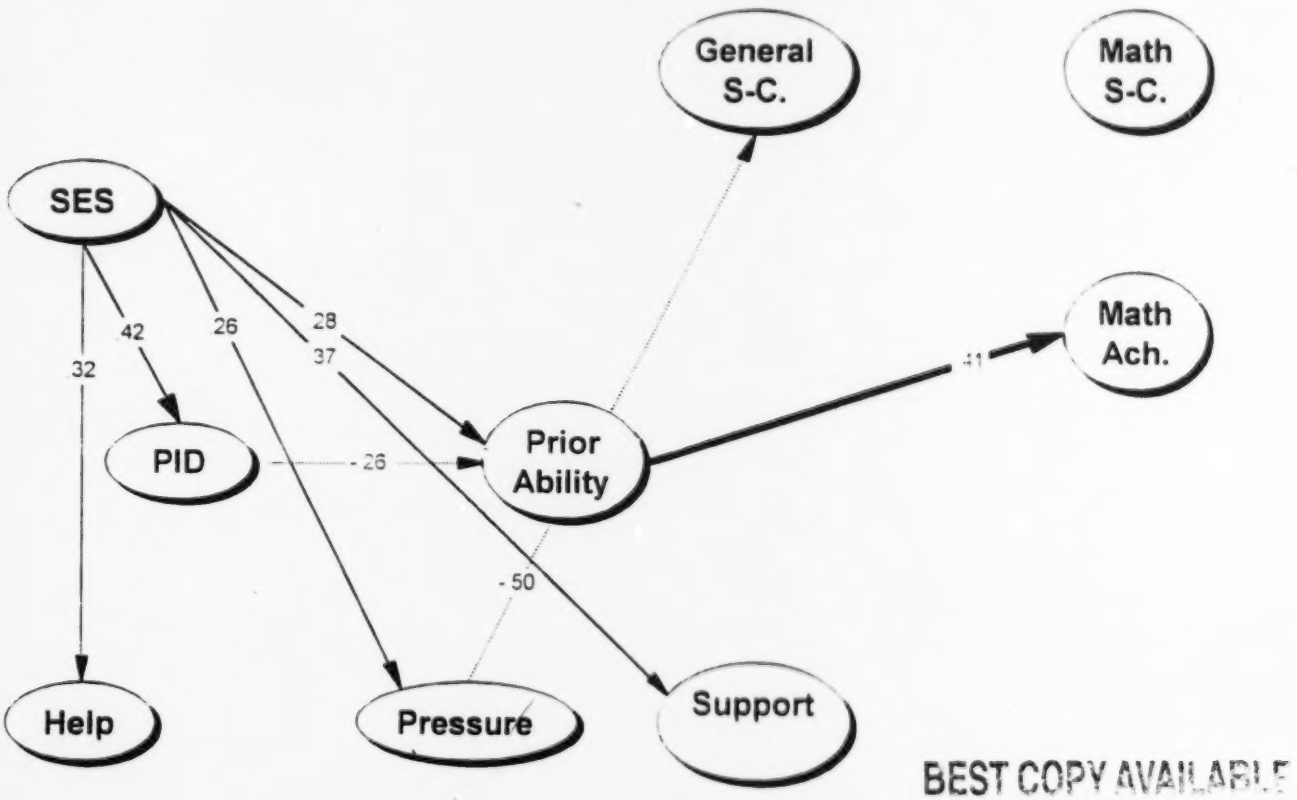

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Figure 3 Math Achievement Gifted Asian American Students

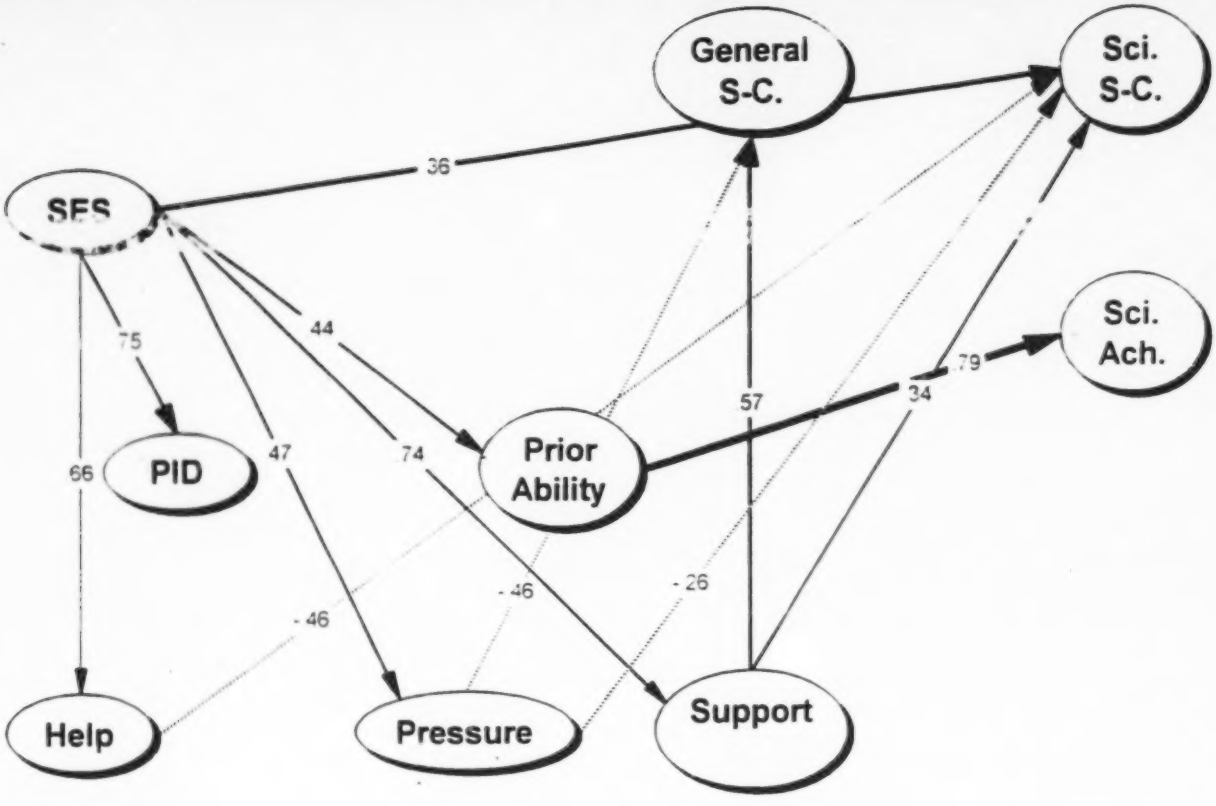

Figure 2 Science Achievement Gifted Caucasian Students

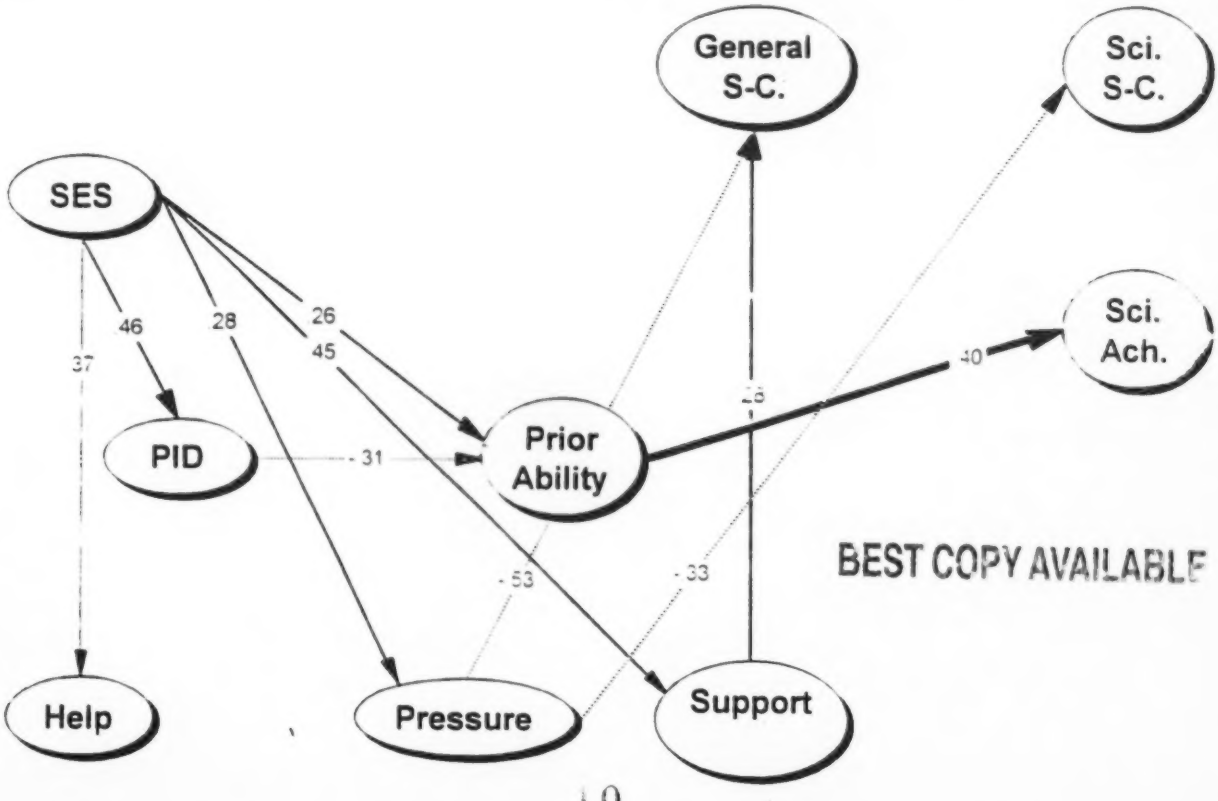

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Figure 4 Science Achievement Gifted Asian American Students

confounding force for the family processes and offered a positive connection with prior family SES was associated with higher subject matter self-concepts for gifted Caucasian American students. Higher SES families have more intellectual resources, give more help, support, and pressure.

The differential socialization process was revealed through the SES findings. High SES families have the financial capital to purchase intellectual resources that can promote their child's education. However, this advantage did not translate into higher academic achievement for this gifted sample, in fact, it proved to be detrimental to the Asian American students. Perhaps, children of high SES families take for granted the numerous resources afforded to them.

The implications of the study call for parents of the highly gifted to tailor their use of family processes to maximize their child's achievement. The family processes are indirectly involved in the students' achievements. Parental influences involve a mix of variables viewed as an interrelated schema (Campbell & Mandel, 1990). Parents of diverse backgrounds should communicate with one another to exchange ideas on successful parenting techniques. School administrators must instruct parents in motivational practices including the use of increasing psychological support, offering moderate levels of help, and decreasing the amount of pressure applied. Parents and teachers are urged to form much closer liaisons to facilitate this development. Parents must provide encouragement, a place of warmth and high expectations, and security to take positive risks.

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